

CLAIMS

What is claimed is:

1. An image capture device, comprising:
 - an illumination source;
 - 5 a thermal model of said illumination source that determines a temperature of said illumination source;
 - a light output model of said illumination source that determines a light output of said illumination source from said temperature; and,
 - 10 an exposure adjustment that is changed to compensate for changes in said illumination source as indicated by said model output.
2. The image capture device of claim 1 wherein said thermal model has a model input and said model input is an indication of the on times and the off times of said illumination source.
- 15 3. The image capture device of claim 2, further comprising:
 - an ambient temperature sensor producing a sensed ambient temperature wherein said temperature is affected by said sensed ambient temperature.
- 20 4. The image capture device of claim 3 wherein said illumination source is at least one light emitting diode.
5. The image capture device of claim 4 wherein said thermal model of said illumination source comprises software executing on a computer.

6. The image capture device of claim 4 wherein said illumination model of said illumination source comprises software executing on a computer.

5 7. The image capture device of claim 4 wherein said exposure adjustment changes said on times of said illumination source.

8. A method of compensating for changes in an illumination source, comprising:

10 determining a temperature of said illumination source;
 determining a light output of said illumination source from said temperature;
 and,
 adjusting an exposure to compensate for changes in said illumination source as indicated by said light output.

15 9. The method of claim 8 wherein said determining a temperature is done using an indication of the on times and the off times of said illumination source.

10. The method of claim 9 further comprising:
 sensing an ambient temperature.

20 11. The method of claim 10 wherein said illumination source is at least one light emitting diode.

12. The method of claim 11 wherein said step of determining a light output includes derating said light output by an amount determined in part by a long-term total on time of said illumination source.

5 13. An article of manufacture comprising a program storage medium having computer readable program code means embodied therein for causing the adjustment of an exposure, the computer readable program code means in said article of manufacture comprising:

computer readable program code means for causing a computer to determine
10 an indication of a temperature of an illumination source;

computer readable program code means for causing a computer to determine
an indication of brightness of said illumination source from said indication of said
temperature; and,

computer readable program code means for causing said computer to adjust
15 said exposure based on said indication of said illumination sources brightness.

14. The article of manufacture of claim 13 further comprising:

computer readable program code means for causing said computer to turn on
and turn off said illumination source.

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15. The article of manufacture of claim 14 further comprising:

computer readable program code means for causing said computer to
determine the on times and off times of said illumination source.

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16. The article of manufacture of claim 15 further comprising:

computer readable program code means for causing said computer to obtain an indication of an ambient temperature; and,

computer readable program code means for causing said computer to adjust said temperature based on said indication of said ambient temperature.

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17. The article of manufacture of claim 16 wherein said illumination source is at least one light emitting diode.

18. The article of manufacture of claim 17 further comprising:
10 computer readable program code means for causing said computer to obtain an indication of a lifetime on time of said illumination source; and,
computer readable program code means for causing said computer to adjust said indication of brightness of said illumination source based on said indication of said lifetime on time.

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19. The article of manufacture of claim 18 wherein said indication of said lifetime on time is stored in a non-volatile storage device.

20. An image capture device, comprising:
20 illumination means;
thermal modeling means, said thermal modeling means producing a thermal modeling means output that is indicative of said illumination means temperature;

brightness modeling means, said brightness modeling means producing a
brightness modeling means output that is indicative of said
illumination means brightness; and,
exposure adjustment means for changing and exposure to compensate for
5 changes in said brightness of said illumination means as indicated by
said brightness modeling means output.

21. The image capture device of claim 20 wherein said thermal modeling
means has a thermal modeling means input and said thermal modeling means input is
10 an indication of the on times and the off times of said illumination means.

22. The image capture device of claim 21, further comprising:
ambient temperature sensor means for producing a sensed ambient
temperature wherein said thermal modeling means output is changed to
15 compensate for said sensed ambient temperature.

23. The image capture device of claim 22 wherein said illumination means is
at least one light emitting diode.

20 24. The image capture device of claim 23 wherein said brightness modeling
means output is affected by an indication of a lifetime on time of said illumination
means.

25 25. The image capture device of claim 24 wherein said indication of said
lifetime on time of said illumination means is stored in a non-volatile memory means.

26. The image capture device of claim 25 wherein said exposure is adjusted by changing said on times of said illumination source.

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